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## Part IV

### Housing and Urban Development Department

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24 CFR Part 3280

Condensation Control for Exterior Walls  
of Manufactured Homes Sited in Humid  
and Fringe Climates; Waiver; Final Rule

EXHIBIT

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**DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT****24 CFR Part 3280**

[Docket No. FR-4578-F-02]

**Condensation Control for Exterior Walls of Manufactured Homes Sited in Humid and Fringe Climates; Waiver****AGENCY:** Office of the Assistant Secretary for Housing—Federal Housing Commissioner, HUD.**ACTION:** Final waiver.

**SUMMARY:** This document advises the public that HUD is issuing a waiver of its regulations regarding the condensation control provisions for exterior walls of the manufactured home construction and safety standards. By this action, HUD is waiving certain provisions of these regulations to permit manufacturers, at their option, to utilize the alternatives provided in this notice to reduce the problems currently being experienced in humid and fringe climate areas. Presently, there are no provisions in HUD's regulations that separately address condensation control and vapor retarder requirements for manufactured homes sited in warm, moist climates of the South Atlantic and Gulf Regions. Based on information provided by the States and the public, HUD has concluded there is an immediate need to recognize alternate requirements for exterior walls in these humid and fringe climate areas that help prevent moisture damage due to condensation. By this action, HUD is finalizing its previously announced proposed waiver. This waiver will be in place while HUD considers a more permanent change to the standards.

**EFFECTIVE DATE:** April 24, 2002.**FOR FURTHER INFORMATION CONTACT:**

Elizabeth A. Cocke, Director, Manufactured Housing and Standards Division, Office of Consumer and Regulatory Affairs, Room 9156, Department of Housing and Urban Development, 451 Seventh Street SW, Washington, DC 20410-8000; telephone (202) 708-6409 (this is not a toll-free telephone number). Hearing and speech-impaired individuals may access this telephone number via TTY by calling the toll-free Federal Information Relay Service at 1-800-877-8339.

**SUPPLEMENTARY INFORMATION:****I. Background**

The Department published a proposed waiver to 24 CFR 3280.504 of the Manufactured Home Construction and Safety Standards on March 30, 2000 (65 FR 17110). The proposed waiver was

issued in response to information received from manufacturers and certain State Administrative Agencies (SAAs) in southeastern States concerning a recent increase in the number and severity of consumer complaints caused primarily by moisture build-up and condensation in homes located in the south. They suggest this increase in complaints coincides with the Department's implementing more stringent energy efficiency requirements in its regulations regarding manufactured home construction and safety standards located at 24 CFR part 3280 (referred to as the "Standards").

At present, § 3280.504 of the Standards does not distinguish among climates for requirements for condensation control and installation of vapor barriers. [The term "vapor barrier" is now commonly referred to as a "vapor retarder". Accordingly, the term "vapor retarder" will be used in all subsequent references throughout the text of this waiver.] Thus, for example, the Standards do not separately address homes placed in humid and fringe environments or climates, which are predominantly located in the southeastern part of the United States. In these climates, it may be beneficial to prevent the outside, moisture-laden air from entering through the warm (exterior) side of the home's exterior wall and condensing and collecting on the cold (living space or interior) side of the wall assembly. One means of preventing moisture from entering the exterior wall cavity from the outside, would be to install a vapor retarder on the warm or exterior side of the wall instead of on the interior or living space side of the exterior wall.

The interior surface of the exterior wall should also then be constructed of a permeable material. This would permit any moisture-laden air that may have entered the wall cavity through a discontinuity in the exterior vapor retarder to be dissipated through the interior permeable material. In such cases, use of vapor retarder paints, vinyl-covered gypsum wallboard, or other impermeable materials or finishes on the interior side of exterior walls could be detrimental, because they would trap moisture within the wall.

**II. This Waiver**

To address these concerns, HUD is issuing a waiver that applies to the first of the alternatives available under § 3280.504(b), the current condensation control and vapor barrier installation requirements for exterior walls in humid and fringe climates. Specifically, this waiver allows manufacturers of homes for humid and fringe climates to

install the vapor retarder on the exterior side, rather than the interior or living space side, of the exterior wall, provided: (1) The exterior side of the exterior wall is constructed with a vapor retarder or exterior covering and sheathing that has a permeance not greater than 1.0 perm; and (2) the interior finish and interior wall panels are designed with a 5 perm or higher rating. The waiver also requires manufacturers to add a statement and a map to the data plate indicating that the home is only suitable for installation in humid and fringe climates (the map designates the acceptable locations for which the waiver is applicable).

**III. The National Fire Protection Association (NFPA) Recommendations**

Previously, HUD designated NFPA as the organization to undertake a voluntary consensus process to assist the Department in developing recommendations for new manufactured housing standards. Participants in the NFPA process met in December 1999 to discuss comments received on recommended standards changes. One such recommendation involved changes to HUD's regulation in § 3280.504(b)(1) for homes sited in "humid climates" or "fringe climates" as set forth in figure 16, in Chapter 21 of the 1989 American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Handbook of Fundamentals. (The Humid and Fringe Climate Map being utilized in this waiver is based on ASHRAE's figure 16.) HUD received the preliminary results of the consensus process deliberations, and the NFPA recommendations have been considered in preparing this final waiver.

The Department expects that recommendations received from the NFPA, research, field data obtained from the use of this waiver, and other information will be available for considering whether to effectuate changes to the standards of a more permanent nature. Any such change would first be reviewed by the Department and the new consensus committee to be established pursuant to section 604 of the Manufactured Housing Improvement Act of 2000 (Pub. L. 106-569, 114 Stat. 2944, approved December 27, 2000). A proposed rule would then be published for public comment.

**IV. Analysis of Public Comments and Other Information Received**

The public comments received in response to the proposed waiver ranged from support for the proposal, to suggestions for revising the proposal, to outright rejection of its provisions. In

general, those who did not favor the proposal indicated that the waiver did not go far enough since it did not address the larger issues of air leakage and transport of moisture-laden or humid air into exterior wall cavities. Two commenters, referencing or quoting the 1993 ASHRAE Handbook of Fundamentals, suggested that while the amount of water deposited in wall or roof spaces by air currents or pressure diffusion cannot be calculated with certainty, under some conditions that amount of water can result in several times the amount of moisture that would be caused by other means, such as vapor diffusion.

While the Department agrees with the concerns raised in the comments, it also believes the waiver provides a partial solution for reducing the extent and number of moisture problems being experienced in Southern climates. Manufacturers who chose to take advantage of the waiver are reminded that it does not consider the larger transport of moisture by air leakage, and that their designs and construction in hot-humid climates also need to address those concerns. Among the strategies manufacturers should consider are: use of exterior air barriers; prevention of air leakage from supply duct systems and other penetrations causing negative pressurization of the home; avoiding use of oversized cooling equipment; and use of balanced mechanical ventilation systems. Complying with the provisions of the waiver does not relieve manufacturers of their responsibilities to use construction methods that result in "durable, livable, and safe housing" as required by 24 CFR 3280.303(b) of the Standards.

Several commenters agreed that an effectively located, good quality vapor retarder could eliminate condensation caused by vapor diffusion (differences in vapor pressure). However, the waiver also requires the interior wall surface to be permeable so that any moisture that does become deposited within the space is not trapped by having an impermeable surface, such as vinyl-covered gypsum panels, on the living space side of the wall.

The NFPA and another commenter recommended that a combined 5-perm rating be used instead of the 3 perm rating suggested in the proposed waiver. HUD agreed with this recommendation since there was no technical basis to support the lower perm rating in recognized engineering manuals, and the final waiver has been revised to require interior finish and wall panel materials to have a combined vapor permeance greater than 5.0 perms. Also, the Manufactured Housing Institute

(MHI) collaborated with the Manufactured Home Research Alliance (MHRA) to test commonly used generic interior finish and wall panel designs to determine if they complied with the combined interior perm rating criteria in the proposed waiver. The results of the testing indicate that compliance with the higher perm rating would easily be achieved. Further, based on the Department's review of the MHI test results (submitted to amend MHI's original comments), the Department will not require testing of gypsum panels (textured or non-textured) that are finished or laminated with acrylic or latex paint or non-vinyl decorative wall paper to demonstrate the panels comply with the 5-perm minimum rating; these combinations of interior finish will be deemed to provide an acceptable level of performance.

One State Agency expressed concern about enforcing different provisions for condensation control for the limited geographic area of the State subject to the Waiver. Two commenters were concerned about potential hardships in relocating homes built under the waiver to cold climate areas for which the homes were not suited. However, those concerns are no different than for other geographic-based requirements in the Standards, such as those for thermal, wind, or roof-load protection. Therefore, the Department has not made any changes based on these comments.

Some commenters also suggested there is authority under the current Standards to permit the vapor retarder to be located on the exterior side of the wall. These commenters assert the 1989 ASHRAE Handbook of Fundamentals recognizes this practice and is incorporated by reference into the Standards. The Department does not agree that all provisions of the 1989 ASHRAE have been incorporated by reference, but to the extent they have been incorporated, the requirements of the Standards govern whenever the provisions of the 1989 ASHRAE Handbook are inconsistent with the requirements of the Standards. In addition, Interpretative Bulletin F-1-76 is not appropriate for these circumstances as it was intended to clarify requirements for cold climates, where vapor diffusion would occur from the interior to the exterior of the home and not vice-versa. As such, IB F-1-76 is applicable to the requirements in § 3280.504(b)(2), rather than § 3280.504(b)(1), the provision to which this waiver is applicable.

The Department did not accept a further recommendation of MHI and another commenter to exempt certain construction (kitchen back splash

materials, bathroom tub and shower compartments, cabinetry and built-in furniture, and hardwood plywood paneling under chair rail areas) from the combined interior perm requirement, because the Department does not have technical data to support their proposal.

The Department also did not accept the commenters' recommendation to combine and simplify the "humid" and "fringe" designations on the map into one area, as both the ASHRAE Handbook of Fundamentals and the NFPA 501 Standard on Manufactured Housing refer to them as two distinct areas in their maps.

In view of all of the above, HUD is issuing this final waiver, but reminds manufacturers that additional measures are likely needed in the design and construction of their homes to sufficiently abate the moisture problems in hot, humid climates and, therefore, comply with other requirements in the Standards.

#### V. Alternative Methods

This waiver is not intended to limit alternate approaches by manufactured home producers in assuring that homes built and sited in humid and fringe climates are durable and free of moisture-related problems. Other methods of moisture control that do not meet the Standards or the conditions of this waiver may be submitted for review and consideration in accordance with 24 CFR 3282.14 (entitled "Alternate Construction of Manufactured Homes").

#### VI. Final Waiver

In accordance with 24 CFR 3280.8 and 42 U.S.C. 3535(q), the Secretary hereby waives, subject to certain conditions, the specific requirements of 24 CFR 3280.504(b)(1) for homes to be sited in humid or fringe climate areas as identified in section V.F. of this waiver. Manufacturers who elect to utilize the alternative permitted under this waiver, rather than to follow the existing requirements in 24 CFR 3280.504(b)(1), must produce homes in accordance with the following requirements (all other requirements of the Standards also continue to apply):

A. Exterior walls must be constructed with one of the following installed on the exterior side of the wall assembly: (1) A vapor retarder of not greater than 1.0 perm when measured and tested in accordance with ASTM E-96-93, Standard Test Methods for Water Vapor Transmission of Materials (dry cup method); or (2) an external covering and sheathing with a combined permeance of not greater than 1.0 perm.

B. The interior finish and interior wall panel materials must have a combined

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vapor permeance greater than 5.0 perm (dry cup method). Gypsum wall panels (textured or non-textured) that are finished or laminated with acrylic or latex paint or non-vinyl decorative wallpaper need not be tested to establish their compliance with the 5.0 perm combined vapor permeance requirement. Other interior finish and wall panel materials, such as vapor retarder paint, vinyl-covered gypsum

wall panels, and other impermeable interior surfaces and finishes, must be demonstrated to have a combined rating greater than 5.0 perm (dry cup method) or they are prohibited.

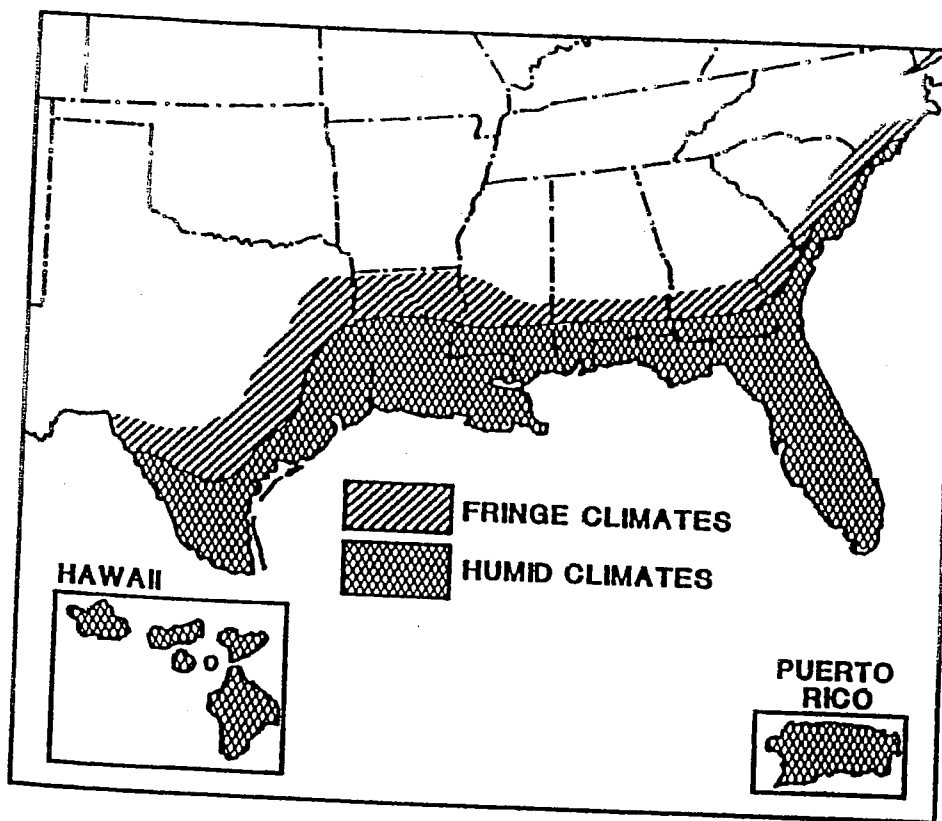
C. Exterior wall cavities shall not be ventilated to the outdoors.

D. An additional statement shall be provided on the data plate required by 24 CFR 3280.5, to read as follows: "As designed and constructed, this home is

suitable for installation only in humid and fringe climates as shown on the Humid and Fringe Climate Map provided with this data plate." The statement is to be typed in bold face using letters at least 1/4 inch in size.

E. A reproduction of the following Humid and Fringe Climate Map is to be provided on the data plate. The map shall not be less than 3 1/2 in. by 2 1/4 in. in size.

## Humid and Fringe Climate Map



F. The following areas of local governments (counties or similar areas, unless otherwise specified), listed by State, are deemed to be within the humid and fringe climate areas shown on the Humid and Fringe Climate Map, and this waiver may be applied to homes built to be sited within these jurisdictions:

### Alabama

Baldwin, Barbour, Bullock, Butler, Choctaw, Clarke, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Lowndes,

Marengo, Mobile, Monroe, Montgomery, Pike, Washington, Wilcox

### Florida

All counties and locations within the State of Florida.

### Georgia

Appling, Atkinson, Bacon, Baker, Ben Hill, Berrien, Brantley, Brooks, Bryan, Calhoun, Camden, Charlton, Chatham, Clay, Clinch, Coffee, Colquitt, Cook, Crisp, Decatur, Dougherty, Early, Echols, Effingham, Evans, Glynn, Wayne, Grady, Irwin, Jeff Davis, Lanier, Lee, Liberty, Long, Lowndes, McIntosh, Miller, Mitchell, Pierce, Quitman,

Randolph, Seminole, Tattnall, Terrell, Thomas, Tift, Turner, Ware, Worth

### Louisiana

All counties and locations within the State of Louisiana.

### Mississippi

Adams, Amite, Clairborne, Clarke, Copiah, Covington, Forrest, Franklin, George, Greene, Hancock, Harrison, Hinds, Issaquena, Jackson, Jasper, Jefferson, Jefferson Davis, Jones, Lamar, Lawrence, Lincoln, Pearl River, Perry, Pike, Rankin, Simpson, Smith, Stone, Walthall, Warren, Wayne, Wilkinson

*North Carolina*

Brunswick, Carteret, Columbus, New  
Hanover, Onslow, Pender

*South Carolina*

Jasper, Beaufort, Colleton, Dorchester,  
Charleston, Berkeley, Georgetown,  
Horry

*Texas*

Anderson, Angelina, Aransas,  
Atascosa, Austin, Bastrop, Bee, Bexar,  
Brazoria, Brazos, Brooks, Burleson,  
Caldwell, Calhoun, Cameron, Camp,  
Cass, Chambers, Cherokee, Colorado,

Comal, De Witt, Dimmit, Duval, Falls,  
Fayette, Fort Bend, Franklin, Freestone,  
Frio, Gavelston, Goliad, Gonzales,  
Gregg, Grimes, Guadalupe, Hardin,  
Harris, Harrison, Hays, Henderson,  
Hidalgo, Hopkins, Houston, Jackson,  
Jasper, Jefferson, Jim Hogg, Jim Wells,  
Karnes, Kaufman, Kennedy, Kinney,  
Kleberg, La Salle, Lavaca, Lee, Leon,  
Liberty, Limestone, Live Oak, Madison,  
Marion, Matagorda, Maverick,  
McMullen, Medina, Milam,  
Montgomery, Morris, Nacogdoches,  
Navarro, Newton, Nueces, Orange,  
Panola, Polk, Rains, Refugio, Robertson,

Rusk, Sabine, San Augustine, San  
Jacinto, San Patricio, Shelby, Smith,  
Starr, Titus, Travis, Trinity, Tyler,  
Upshur, Uvalde, Val Verde, Van Zandt,  
Victoria, Walker, Waller, Washington,  
Webb, Wharton, Willacy, Williamson,  
Wilson, Wood, Zapata, Zavala

Dated: April 16, 2002.

**John C. Weicher,**

*Assistant Secretary for Housing-Federal  
Housing Commissioner.*

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